

A urological challenge: Voiding dysfunction in multiple sclerosis

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Abstract

Patients with multiple sclerosis (MS) have a very high prevalence of lower urinary tract symptoms. This summary provides a brief overview of MS epidemiology, pathophysiology, the impact of the disease on patient quality of life, and the particular kinds of urinary tract abnormalities and symptoms that can present among patients with MS. Strategies to help diminish the impact of these symptoms are also discussed.

Patients with multiple sclerosis (MS) have a very high prevalence of lower urinary tract symptoms—as many as 90% of patients with MS experience some form of voiding dysfunction and/or incontinence.¹ MS is most commonly diagnosed among patients aged 20 to 50 years, with the ratio of women to men approximately two to one. Individuals with the disease experience a loss of neural conduction along axonal pathways through autoimmune-driven demyelination. Resultant edema also worsens the neurologic impairment. Over time, chronic attacks lead to scarring of nerves, which leads to severe and often permanent neurologic dysfunction. The pattern of these attacks varies, as there are four subtypes of MS: relapsing-remitting, secondary progressive, primary progressive and progressive-relapsing. The majority of patients fall into the relapsing-remitting subtype.

Depending on the region of the central nervous system affected, patients with MS present with a wide variety of neurologic symptoms. MS-associated damage in the brain can result in cognitive impairment, sensory and motor deficits, depression and epilepsy. Optic nerve damage is common, with painful loss of vision the result. Neuronal damage to the pons can result in clumsiness, poor balance, diplopia, vertigo, swallowing problems or weakness, while spinal cord damage in MS is associated with stiffness, paroxysmal spasms and weakness.

Pathophysiology of LUTS in MS

With respect to lower urinary tract symptoms (LUTS), brain deficits can also lead to loss of voluntary control of initiation and detrusor overactivity.

Other LUTS secondary to MS are mediated by axonal damage in the pons and the spinal cord. The lateral corticospinal and reticulospinal cords, in particular, are responsible for innervation of the lower urinary tract.² Damage to these pathways can result in detrusor-external sphincter dyssynergia (DESD), detrusor overactivity (DO) and detrusor hypocontractility. These are the most common findings of urodynamic studies among patients with MS.

Prevalence of LUTS in MS

Patients with MS can experience any number of LUTS, including urgency, frequency, incontinence, hesitancy and retention (Table 1).^{3,4} It is uncommon that a urinary tract symptom would be the presenting complaint that leads to a diagnosis of MS (fewer than 10%), but it does happen.

A review of studies reporting prevalence of LUTS among patients with MS showed that the prevalence of urgency ranged from 60 to 86%, frequency from 50 to 83%, incontinence from 19 to 83%, hesitancy from 28 to 58% and retention from 2 to 20%.^{5,6}

Management of LUTS in MS

The urologic evaluation in patients with MS should include the basic clinical evaluation (including impact analysis and degree of bother), basic physical examination (including stress test in women), urinalysis (with or without culture and sensitivity) and urodynamic studies.

A number of treatment options can be used for LUTS in the setting of MS. Anticholinergic medications can be used to treat symptoms of urgency and incontinence. A 2012 review of studies evaluating antimuscarinics for the treatment of overactive bladder showed that solifenacin, oxybutynin and propiverine were associated with the best numerical reductions in incontinence episodes per 24 hours of all the antimuscarinics examined (not an MS-specific analysis).⁷

Table 1. Proportions of patients with multiple sclerosis experiencing lower urinary tract symptoms*

Study	No. patients	Urgency	Frequency	Incontinence	Hesitancy	Retention
Miller 1965 ¹³	321	60	50	36	33	2
Bradley 1973 ¹⁴	90	86	60	-	28	20
Hennessey ¹⁵	99	191	71	76	19	48
Ukkonen 2004 ¹⁶	24	3	54	75	58	-
Quarto 2007 ⁴	107	61	83	32	-	-

*Modified from Fernandez et al.³ and Quarto et al.⁴

For DO, counselling on lifestyle habits and training on pelvic floor exercises are the backbone of therapy. Antimuscarinics may also help with DO-related symptoms. Botulinum toxin A has also been examined among patients with neurologic problems (mixed populations of MS and spinal cord injury).⁸⁻¹⁰ In these studies, more than half the patients treated experienced significant improvement in symptoms. Indeed, as many as 76% of patients in one trial achieved complete continence.¹⁰

Although surgery is not typically used to address LUTS in the setting of MS, midurethral slings may be helpful.

Neuromodulation can also be considered for DO. Posterior tibial nerve stimulation has demonstrated substantial efficacy in the setting of MS.¹¹ Daily 20-minute sessions of transcutaneous posterior tibial nerve stimulation (TPTNS) led to clinical improvement (urgency, incontinence, frequency) in 82.6% and 83.3% at day 30 and day 90, respectively. Cystometric response to TPTNS was positive in 51.2% (increase of >30% of cystometric capacity and/or reflex volume).¹¹ There is less compelling evidence for the use of sacral nerve stimulation, although promising results have been demonstrated in a small series of nine patients.¹²

For patients with hypo/atonic bladder, drainage is necessary if there are bothersome post-void symptoms. Clean intermittent catheterization (CIC) is preferred when possible, while in-dwelling catheters or suprapubic (SP) tubes are other options (patients overwhelmingly prefer the latter). Notably, neuromodulation is not an option in this scenario, as it addresses pelvic floor/sphincter overactivity and not hypotonic bladder.

The most challenging aspect of treatment of LUTS in MS is addressing DESD, particularly when accompanied by DO. Individually tailored treatment may include biofeedback, treatment with alpha-blockers, myorelaxants, antimuscarinics and/or botulinum toxin injections (both in the bladder and the sphincter).

Conclusions

LUTS are common, nearly ubiquitous complications of MS. Urologists and urogynecologists can benefit from enriching their understanding of the pathophysiology and complications associated with this disease. The modalities used to treat LUTS in this setting are similar to those used in other populations, although treatment success may be more elusive, particularly among those with both DESD and DO.

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